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16 August 1982

MEMORANDUM FOR THE RECORD

SUBJECT: Support to Under Secretary of State Buckley

"The Impact of the US Embargo on Oil and Gas Equipment and Technology of the USSR" (see attached) was prepared pursuant to a request from Under Secretary Buckley, transmitted by his assistant, Mr. Michael Marks. The analysis was requested for use by the Under Secretary in connection with matters relating to the US embargo and as background for responding to queries concerning the impact on the Soviet Union. The memorandum was transmitted to Mr. Marks by LDX on 13 August 1982.

25X1

[redacted]
Chief,
Resources Branch
Soviet Economy Division/SOVA

Attachment:
as stated.

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The Impact of the US Embargo on Oil and Gas Equipment and Technology to the USSR

Conclusions

Overall, US sanctions to prevent shipment of oil and gas goods and technology to the Soviet Union will have only a relatively small transitory effect on Soviet oil and gas production. A full embargo by the COCOM countries would have substantial impact.

- The USSR will continue to seek foreign technology to help overcome the increasing difficulties of oil and gas production.
- An embargo on US exports of oil and gas equipment will have a short-term impact. In nearly all cases the Soviets can obtain the equipment from non-US suppliers, with only a moderate delay.
- A COCOM-wide embargo, if sustained, would substantially limit Soviet oil, and especially gas, output. The principal impacts would be on gas pipelines, gas production, and exploration, drilling, and refining.
- Non-COCOM producers can currently supply most Soviet offshore needs and could, within 1 to 2 years, begin to fill Soviet needs for fluid-lift and drilling equipment.
- If the Soviets could overcome the severe quality problems at existing Soviet plants producing submersible pumps, drill bits, and drill pipe, the impact of US or COCOM-wide embargoes would be further reduced.

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Background

Imports from the West have been only a small--albeit disproportionately important--part of the total Soviet suply of oil and gas equipment. In recent years, the Soviets have been encountering mounting difficulties in locating new oil reserves, increasing development drilling, lifting fluid, and undertaking offshore exploration and production. These difficulties, together with the challenges associated with transport of oil and gas over vast distances, will prompt them to acquire substantial amounts of advanced Western equipment and technology. Soviet efforts to achieve self-sufficiency in high technology oil-country equipment are proceeding slowly.

Although two projects--the Siberia-to-Western Europe natural gas pipeline and the Sakhalin offshore oil and gas development project--have received the most attention, imports of oil and gas equipment are important to other major Soviet and gas projects.

This memorandum summarizes the importance of major types of Western equipment to the USSR. In addition we address, where relevant, the following impacts that an embargo might have: losses or delays in oil and gas production, hard currency losses, diversion of equipment from other industrial projects, and delays in Soviet plans to curb oil consumption through an increase in gas or coal consumption. Two basic scenarios are considered: (1) the embargo on oil and gas goods and technology imposed by the United States alone, and (2) a full embargo by the COCOM countries. The accompanying table summarizes the impacts.

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The Importance of Major Types of Western Equipment

Exploration Equipment

Having found most of the easily accessible deposits, the Soviets now need Western seismic and well-logging technology to accelerate discovery of additional oil reserves in the 1980s. Because five or six years usually elapse between discovery and production, Western equipment ordered today is unlikely to have much impact on oil production before the late 1980s. Although US firms are the leaders in this field, West European firms can provide similar equipment. Therefore, an embargo by the US alone would have little impact. A full embargo by the COCOM countries could hamper long-term production, but the impact would be felt only after 1990.

Drilling and Wellhead Equipment

The Soviets plan to nearly double drilling for oil and gas by 1985. Although their drilling productivity is relatively poor, the Soviets have been primarily self-sufficient in onshore drilling equipment, with the exception of high-pressure blow-out preventers and drill pipe. A new Soviet drilling rig plant and a Western-designed drill bit plant (which is currently experiencing startup problems) will help to perpetuate their general independence. Drill pipe imports will, however, continue to be important. Futhermore, US technical assistance could improve product quality at the turn-key Dresser drill-bit plant in Kuybyshev.

Although the US has set the pace in the manufacture of drilling equipment, tubular goods, and well-head equipment, producers in Japan and Western Europe are supplying the Soviet market with drill pipe and considerable tonnages of casing and tubing. These countries have also been providing some well-head equipment and within a year or so could manufacture items that thus far have remained a US monopoly. In sum, for this category of equipment, an embargo imposed by the United States alone would have a sizeable immediate impact by slowing the assimilation of the drill-bit plant and denying the USSR selected wellhead equipment for the extraction of high-sulfur gas. The effect would diminish greatly within one to two years as firms from other countries begin to supply the equipment.

A full embargo by the COCOM countries, however, could severely limit the drilling program. The Soviets now rely on large amounts of imported drill pipe and related tubular goods. Any substantial shortfall in drilling is immediately felt in oil production. A COCOM denial of drill pipe, casing, and tubing could only be partially offset by other suppliers, such as Austria and Sweden. The impact on production is difficult to quantify, but if Western imports support 5-percent of the drilling effort (probably a conservative estimate), then a 5 percent decrease in this year's Oil Ministry drilling plan could mean the loss of about 60,000 to 100,000 b/d of oil production capacity--equivalent to $0.7-$1.1 billion annually at $30-per-barrel oil for perhaps 1-2 years before Soviet and non-COCOM

producers could supply the market. The gravity of the situation would presumably force the Soviets to divert already strained steel resources to pipe production.

Fluid-lift Equipment

As the water flow in Soviet oil wells increases, so does the industry's fluid-lift requirements. The planners foresee that producing 12 million b/d of oil in 1985, for example, would require lifting over 6 million b/d more fluid than was required to produce the same amount of oil in 1980. They expect that twice as many of their producing wells will need submersible pumps and gas-lift equipment.

Although US producers now have a monopoly in high-capacity pumps, other Western suppliers have the technical competence to enter the field within about two years. Although no pumps have been purchased since 1978, the Soviets expressed interest last year in the purchase of 400 of these pumps. Gas-lift equipment can be supplied by firms in France and elsewhere.

Neither of the embargo scenarios would have a major impact unless the Soviets were attempting to purchase large quantities of electric submersible pumps. The 400 pumps discussed above could perhaps support some 300,000 b/d of oil production--about twice the volume that could otherwise be produced from the wells in which they would be installed. This volume of oil could provide over $3 billion a year in hard currency earnings. A US embargo would have only transitory impact until other Western suppliers enter the field. A full embargo by the COCOM countries would have a more lasting effect, but eventually another Western

supplier--possibly Sweden-- might be found if the Soviets would guarantee a substantial continuing market for the pumps. The Soviets have built a submersible pump plant, but are experiencing severe problems in output quality. The eventual efficient operation of the plant, if achieved, could make the Soviet independent of submersible pump imports. Gas-lift equipment is produced in Mexico and Brazil, thereby blunting the potential impact of a COCOM embargo.

Offshore Equipment

Oil and gas production in the late 1980s and beyond will depend heavily on offshore development. For this, the Soviets already make substantial use of Western equipment; expanded use of seafloor production systems could speed development off Sakhalin and in the Caspian Sea area. But there is no lack of offshore suppliers. In addition to the major Western countries, Singapore, Mexico, Finland, and Yugoslavia are capable now of supplying most of the USSR's offshore needs and could supply them all by the late 1980s. A few drilling components and seafloor completion systems are now produced only in the United States or by Canadian subsidiaries of US firms, but other countries could quickly introduce them.

The Sakhalin project has been delayed by the US embargo. The delay has, however, been largely due to the very short drilling season off northern Sakhalin and the lead times required to establish new equipment suppliers. After a year or so the needed equipment could be provided by alternative suppliers outside the COCOM group. Japanese withdrawal from the project

would not necessarily foreclose its continuance. The Soviets might engage cooperations of Finnish firms, for example, in the development of oil resources. But to be economically viable, the project must also produce gas--and Japan is the only market now in prospect. .

Oil Refining Equipment

The Soviets intend to expand their secondary refining capability substantially in the 1980s. Installation of additional secondary refining capacity will make refinery operations more efficient, allow the Soviets to refine higher sulfur crude oils, and improve the overall Soviet energy mix. Plans to substitute gas for oil would be hampered by a Soviet inability to further refine the heavy fuel oil, which currently comprises a large share of refinery output. We anticipate that the export market for this heavy fuel oil will continue to be extremely limited.

The Soviets have yet to conclude any new agreements for secondary processing units, thus putting the impact of any Western embargo in doubt. A decision to go it alone and rely heavily on East European equipment, implies a heavier investment in the petroleum and chemical machine-building sector.

Gas Processing and Pipeline Equipment

Although the CEMA countries produce most of their own equipment for oil pipelines, the USSR relies extensively on Western pipe and equipment for gas pipeline. Western equipment acquired over the next several years for handling high-pressure gas and sour gas could be responsible for nearly one-fifth of the

USSR's projected natural gas production by 1986 and for substantially more thereafter. Western European firms can provide the needed expertise for the development of sour gas fields such as Astrakhan. The processing of such gas could require some US technology. Because pipelines are the principal bottleneck in Soviet gas production, large-diameter pipe and valves, pipelayers, and turbine-compressors from the West are of prime importance to meeting the Soviet gas industry's development plans.

The extended embargo imposed by the United States alone will have little impact on the Soviet's ability to deliver gas to Western Europe. The embargo is disrupting plans for equipping compressor stations on the Siberia-to-Western Europe export pipeline. It might even cause diversion of domestic equipment to the export pipeline. We estimate that the maximum resulting loss to the domestic economy might be as much as 30 billion cubic meters of gas annually for a year or two.* By taking compressor equipment from several domestic pipelines, the loss could be held to perhaps 15 billion cubic meters. A full embargo by the COCOM countries (including large-diameter pipe) would have a much more serious impact on the Soviet gas industry, curtailing major pipeline projects, reducing annual gas supplies by some 100 BCM below the 1985 plans, and causing substantial domestic economic dislocations.

* The 30 billion cubic meters of gas is equivalent to about 15 percent of the expected increment in 1981-85 Soviet energy consumption, about 20 percent of the expected increment in domestic gas consumption, and the energy equivalent of over 181.5 million barrels of oil (worth $5.4 billion at $30 per barrel).

Impact on the USSR of Denial of Western Oil and Gas Goods and Technology

	Degree of Soviet Need For Western Equipment	Impact of Embargo Implemented by US Only	Impact of Embargo Fully Implemented by All COCOM Countries
Exploration equipment	Substantial	Minimal - available from West Germany, Norway, United Kingdom, and Canada.	Minimal before 1990 because of 5 to 7 year lag between discovery and production; moderate to substantial after 1990.
Drilling and wellhead equipment			
Drill bits	Moderate	Moderate - US technical assistance needed to improve efficiency of operation at Dresser drill-bit plant in Kuybyshev, although other Western companies could help with some delay.	Moderate - After a year or so, Soviets could assimilate new capacity or receive help from non-COCOM countries.
Drill pipe, collars, tool joints	Moderate	Minimal - Available from Japan, Italy, France, and West Germany.	Moderate - Quality of Soviet product is poor; steel in short supply.
Blow-out preventers and wellhead equipment	Moderate (substantial for certain fields)	Initially substantial, diminishing to minimal - US and US subsidiaries sole source in short run; non-US substitutes could be available in about two years.	Initially substantial, diminishing to moderate - Equipment essential for high-pressure and high-sulfur oil and gas production; non-COCOM sources (such as Sweden) might emerge in a few years
Fluid-lift equipment			
Submersible pumps	Substantial	Potentially substantial, diminishing to minimal - Currently US monopoly; the quickest solution to rapidly mounting fluid-lift requirements, but none purchased for severeal years; non-US substitutes could be available in 1 to 2 years.	Potentially substantial - although non-COCOM source (such as Sweden) might emerge.

Gas lift	Substantial	Minimal - France and Japan currently can supply Soviet needs.	Moderate - Equipment also available from Mexico and Brazil.
Offshore equipment	Substantial	Minimal - Only a few key components produced in US; other producers could substitute in about a year.	Minimal - Equipment could be produced by suppliers outside the COCOM countries.
Gas pipeline equipment			
Large-diameter pipe and valves	Substantial	None - US does not make 1,420 mm pipe.	Substantial - Soviet pipe so far is inadequate for 75 atmosphere pressures; pipemill capacity for large diameter pipe is limited .
Pipelayers	Substantial	Minimal - Available from Japan; possibly Italy in near future.	Substantial - Soviet heavy duty pipelayers just beginning to be available; service life, performance uncertain.
Turbines and compressors	Substantial	Minimal if West European manufacturers violate US sanctions; moderate if they obey US sanctions, but develop and supply alternative equipment to Soviets.	Substantial - Soviet production deficient in both quantity and quality.
Gas processing equipment	Substantial	Moderate, diminishing over time - US firms lead the field, but French and Germans experience and Japanese could enter market. Some delay likely in Astrakhan and Tenghiz projects without US involvement.	Initially substantial, diminishing to moderate - Currently no non-COCOM producers, but one could emerge in 1 to 2 years.
Oil refining equipment			
Secondary processing units	Moderate	Minimal-to-Moderate - US leads the field, but French and German firms also have experience. Impact depends on Soviet intentions. Lack of recent agreements on secondary units suggests Soviets may not intend to rely on imported equipment.	Moderate - No major equipment producers outside COCOM countries.